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Studying the fidelity of quantum memory based on control-field angular scanning

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Abstract

The fidelity of multimode cavity-assisted quantum storage based on control-field angular scanning is analysed as a function of an input pulse temporal shape, direction of propagation of the control field and spatial structure of the signal field. It is shown by numerical simulation that available range of the angular scanning is reduced with increasing the transverse mode index of the field to be stored. Outside of this range, the output field may contain contributions from undesirable transverse modes due to the cross-talk, which results in reducing efficiency and fidelity.

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